

The California Office of AIDS is currently performing death certificate searches on a monthly basis, including a review of racial or ethnic classification as marked on the death certificate and has initiated a retrospective search of deaths from the period 1980–87. Discrepancies in classification are sent to the field staff in reporting counties, and they reevaluate information on decedent and parents and may change the classifications. We suggest that other jurisdictions may also want to evaluate AIDS deaths among minorities by performing similar death certificate searches. The problem of misclassification might also be reduced by developing uniform and specific instructions for determining Hispanic status to all persons completing AIDS reporting forms.

References

1. Friedman, S., et al.: The AIDS epidemic among blacks and Hispanics. *Milbank Q* 65: 455–498 (1987).
2. Dondero, T., et al.: Monitoring the levels and trends of HIV infection: the Public Health Service's HIV surveillance program. *Public Health Rep* 103: 213–220, May–June 1988.
3. AIDS and Human immunodeficiency virus infection in the United States: 1988 Update. *MMWR* 38 (5–4), May 12, 1988.
4. California AIDS Update: AIDS among California Hispanics. California Department of Health Services, Office of AIDS 2:

- 137–146, December 1989.
5. California AIDS Update: AIDS among California blacks. California Department of Health Services, Office of AIDS 2: 21–30, March 1989.
6. Chamberland, M., et al: Acquired immunodeficiency syndrome in New York City, evaluation of an active surveillance system. *JAMA* 254: 383–387, July 19, 1985.
7. Day, J., et al.: Validation of AIDS surveillance through a one-year death certificate review. Abstract, III International Conference on Acquired Immunodeficiency Syndrome (AIDS), June 1–5, 1987, Washington, DC, p. 70.
8. Hardy, A., et al.: Review of death certificates to assess completeness of AIDS case reporting. *Public Health Rep* 102: 386–391, July–Aug. 1987.
9. Conway, G., et al.: Underreporting of AIDS cases in South Carolina, 1986 and 1987. *JAMA* 262: 2859–2863, Nov. 24, 1989.
10. Hayes-Bautista, D., and Chapa, J.: Latino terminology: conceptual bases for standardized terminology. *Am J Public Health* 77: 61–68, January, 1987.
11. Trevino, F.: Standardized terminology for Hispanic populations. *Am J Public Health* 77: 69–72, January, 1987.
12. Davis, K. B., et al.: A test of the national death index, using the Coronary Artery Surgery Study (CASS). *Controlled Clinical Trials* 6: 179–191, 1985
13. Marzuk, P., et al.: Increased risk of suicide in persons with AIDS. *JAMA* 259: 1333–1337, March 4, 1988.
14. Kizer, K. W., et al.: AIDS and suicide in California. *JAMA* 260: 1981, Oct. 7, 1988

Comparison of Risk Factors for Ill Health in a Sample of Homeless and Nonhomeless Poor

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Synopsis

This cross-sectional survey was undertaken to examine whether the homeless poor have a higher prevalence of risk factors for ill health than the nonhomeless poor. Seventy-one adults in four age groups who attended a free-meal program in northern California were recruited during a 1-month period in 1987. The majority of the respondents lived on the streets, in vehicles, or in substandard housing located in an area

undergoing rapid urban redevelopment. Regardless of employment or government assistance, the income of 100 percent of the respondents fell below the Federal poverty level.

Overall, the sociodemographic profile of the study population was remarkably similar to that of the general population of California adults. Sixty-six percent had completed high school, 78 percent had lived in the city for 5 or more years and, at most, 23 percent reported serious alcohol or emotional problems. When compared with the nonhomeless poor, the homeless poor were slightly less educated, more mobile, and more likely to report alcohol and emotional problems.

Larger differences were evident for health-related variables, with the homeless poor being significantly less likely to have health insurance coverage, to receive preventive health care, and to be nonsmokers than the nonhomeless poor (P values <.05). There were also large differences in access to heated rooms, running hot water, and cooking facilities, with approximately 90 percent of the homeless poor reporting no access to these fundamental necessities.

A STRONG ASSOCIATION between socioeconomic status and disease has been documented consistently over the last two decades, with the highest rates of illness and death occurring among those who are most impoverished (1-4). This association persists across most diseases with few exceptions and continues for the entire life span of both males and females (1, 2). In recent years, the adverse effects of low socioeconomic status on health have become a public health problem of major concern because of the increasing numbers of those who are homeless and very poor (5, 6).

Although there is a growing body of literature on the health of homeless and very poor adults (7-18), much of it is compromised by methodologic and analytic problems (7-11, 14). For the most part, studies have lacked standardized definitions of health problems, collected data on small unrepresentative samples, analyzed results for overall samples without examining whether heterogeneous subgroups might be represented, and focused on individual risk factors without exploring factors in the social and physical environments that might contribute to poverty and disease. Much of the research conducted to date has originated from the field of psychiatry and suggests that factors such as alcohol abuse, mental illness, the existence of large families, and transiency account for homelessness and the subsequent risk of poor health (7-10). The contributions of environmental risk factors, such as unemployment, unavailability of health insurance, and lack of preventive health care services have rarely been explored (12, 16).

This cross-sectional survey is the first in a series of studies that will begin to delineate different subgroups within the homeless and very poor whose risk factors for ill health may differ significantly. This report presents results from an initial survey that allowed us to compare the sociodemographic and health profiles of two subgroups within a population of impoverished adults to generate hypotheses for a large-scale survey of those who were homeless.

Methods

The survey was conducted at an independent non-profit program in San Jose, CA, that provides free meals and social services to adults and children living in poverty. Those who attend the free-meal program live in a downtown area that is undergoing rapid urban redevelopment where most of the housing is old and poorly maintained. Most of the guests receive their food from soup kitchens, obtain their clothing from donated sources, have no private transportation, and receive medical care from emergency rooms or county clinics.

Adult women and men were recruited from four age groups (20-29, 30-39, 40-49, 50 and older) over a

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1-month period in the spring of 1987. All age-eligible persons were recruited regardless of appearance or behavior until a quota of 10 adults in each age and sex group was met (total $N = 80$). Although our future work will focus on homeless adults, this survey included poor persons regardless of whether they were currently homeless. This provision allowed for a broader examination of the very poor, many of whom are temporarily homeless over a course of time depending on such factors as housing, employment, and personal circumstances.

Because of financial constraints, this preliminary survey sampled persons from only one setting where poverty-stricken people are found. Although sampling from more representative settings is needed before generalizations can be made to broader populations of impoverished groups, past research does suggest that samples drawn from free-meal programs represent a wider spectrum of homeless adults than samples drawn from settings such as psychiatric or substance abuse facilities that serve special subgroups (17, 18).

Survey information was collected on demographic and behavioral factors, disease risk factors, health care utilization, and environmental and economic conditions. Participants were administered a questionnaire containing both multiple-choice and open-ended questions by three health professionals. All interviews were conducted in a separate room to allow for privacy and to enhance the accuracy of responses.

To compare sociodemographic characteristics of the study population with those of adults in the general population, data from the following two comparison groups were analyzed: the 1980 California census (19) and the 1982 California Behavioral Risk Factor Survey (20). Data from the 1980 census represent a 20-percent sample of all adults in California 25 years or older; the Risk Factor Survey contains data on approximately 1,500 randomly selected California residents 18 years or older.

Separate analyses compared persons with permanent shelter (the nonhomeless poor) to those without permanent shelter (the homeless poor) to examine whether

Table 1. Demographic profile of the homeless and nonhomeless poor, northern California, 1987 (percentages)

Category	Shelter absent (N=19)	Shelter present (N=52)	Total (N=71)
Sex:			
Male	68.4	32.7	42.3
Female	31.6	67.3	57.7
Age:			
20-29	26.3	28.8	28.2
30-39	42.1	26.9	31.0
40-49	26.3	15.4	18.3
50 and older	5.3	28.8	22.5
Race:			
White	73.7	63.5	66.2
Hispanic	15.8	30.8	26.8
Black	10.5	5.8	7.0

Table 2. Economic and environmental conditions of the homeless and nonhomeless poor, northern California, 1987 (percentages)

Category	Shelter absent (N=19)	Shelter present (N=52)	Total (N=71)
Employed:			
Yes	31.6	19.2	22.5
No	68.4	80.8	77.5
Below poverty level in previous year:			
Yes	100.0	100.0	100.0
No	0	0	0
Place of residence:			
Street	68.4	0	18.3
Vehicle	21.1	0	5.6
Emergency shelter	10.5	0	2.8
Room	0	38.5	28.2
Apartment or house	0	61.5	45.1
No access to residential—			
Heat	89.5	13.5	33.8
Running water	73.7	1.9	21.1
Hot water	89.5	15.4	35.2
Bathing facility	89.5	5.8	28.2
Refrigerator	84.2	7.7	28.2
Cooking facilities	84.2	13.5	32.4

¹This compares to 58.7 percent of the general adult California population, as reported in the 1980 census.

²This compares to 11.4 percent of the general adult California population, as reported in the 1980 census.

subgroups within the study population exhibited different risk factors for ill health. Persons living in trailers, rooms, apartments, or houses were classified as having permanent shelter, whereas those living on the streets, in tents, vehicles, or emergency shelters were classified as having no shelter. To test whether the homeless poor were significantly different from the nonhomeless poor, the continuity adjusted chi-square test was used except when more than 20 percent of the cell expected values were ≤ 5 , and in these cases the Fisher's exact test was used.

Results

Of the 80 age-eligible adults recruited for the sample, 71 agreed to participate, yielding a response rate of 89 percent. The profile of the study population (table 1) shows that participants were primarily non-Hispanic white adults. When the demographic characteristics of the 71 respondents were compared with the 9 non-respondents, there were no differences by race; however, slightly more females and younger people agreed to participate in the survey. Of the 71 participants, 73 percent were classified as having permanent shelter and 27 percent as not having shelter.

The study population, especially those lacking shelter, experienced a low standard of living as measured by economic and environmental conditions (table 2). Only 22.5 percent were employed compared with 58.7 percent of adults canvassed in the 1980 California census. (As in several surveys of the homeless, however, the majority of the study participants indicated that jobs were their most urgent need.) A large difference also existed between the study population and California adults in the percentage of persons living below the poverty line (100 percent of the study population versus 11.4 percent of California adults). This level of poverty persisted regardless of employment status or government assistance. All participants reported extremely poor living conditions, with large disparities in access to heated rooms, running hot water, and cooking facilities existing between the sheltered and nonsheltered poor. Approximately 15 percent of the sheltered poor reported no access to these fundamental necessities compared with 90 percent of the nonsheltered poor (P values $<.001$).

Because health care is often influenced by economic and social conditions, we examined whether participants had health insurance coverage as well as how recently they had seen a physician and received selected types of preventive health care (table 3). The nonsheltered poor were significantly less likely to have health insurance coverage than the sheltered poor—78.9 percent compared with 26.9 percent had no health insurance ($P<.001$). In addition, the nonsheltered poor were significantly less likely to receive screening for hypertension or to receive routine dental care. Those without shelter were also less likely to see a physician or receive screening for cervical cancer, although these differences did not reach statistical significance. It is important to note that, regardless of the presence or absence of shelter, almost none of the respondents received routine dental care (overall 76.1 percent reported no routine dental care in the 12 months preceding the survey). Preventive dental care was even more infrequent among the children of the respondents: 88

percent of the children under the age of 18 ($N=43$) had never seen a dentist for routine care (not shown).

Although this survey was not designed as an indepth evaluation of sociodemographic risk factors, preliminary data were collected on a set of such characteristics (table 4). Despite the overall poverty level, two-thirds of the study population had completed high school, and more than one-fourth had completed at least some college. Ninety percent spoke fluent English. Although the majority were in the age groups most likely to have children, only 25 percent had dependents under the age of 18 living with them. The large majority of those interviewed were long-term residents of the community; 77.5 percent had lived in the San Jose area for 5 or more years. (While this figure indicates a general stability within the local geographic area and possible knowledge of health and social services, it does not imply stability in housing.) Almost 20 percent had been diagnosed as having hypertension, whereas 43.7 percent were current cigarette smokers. At most, 23 percent reported serious alcohol or emotional problems (see definitions given subsequently). When these sociodemographic data were stratified according to the presence or absence of shelter, the only significant difference found was for cigarette smoking: 68.4 percent of those without shelter reported being a current smoker compared with 34.6 percent of those with shelter.

To evaluate whether the sociodemographic profile of the study population differed from adults in the general population, the findings in table 4 were compared with data from the two comparison populations described in the methods section. The percentage of those completing high school in the study population was slightly lower than in the census population (66.2 percent compared with 73.5 percent of adults in California). Interestingly, slightly more of the study population than the census population had completed at least some college (26.8 versus 19.6 percent) despite the lower age cut-point for the study population, which could create a conservative estimate.

Possibly because of limited resources and children being placed in foster care, the percentage of the study population having dependents living with them was much lower than that of California adults (25.4 percent compared with 50.7 percent). Geographic mobility patterns were almost identical in the two groups, with similar percentages having lived in their communities for 5 or more years. While rates of hypertension in the study population were similar to rates for adults from the California Behavioral Risk Factor Survey, smoking rates were substantially higher (43.7 percent of the study population compared with 28.0 percent of California adults).

Although the study population did not report a substantially higher prevalence of alcohol or emotional

Table 3. Health insurance coverage and receipt of health care of the homeless and nonhomeless poor, northern California, 1987 (percentages)

Category	Shelter absent (N=19)	Shelter present (N=52)	Total (N=71)	P1 value
Type of health insurance:				
None	78.9	26.9	40.8	...
Medical	21.1	42.3	36.6	<.001
Medicare	0	15.4	11.3	...
Private	0	15.4	11.3	...
Physician visit:				
In previous 12 months	57.9	80.8	74.6	.089
1-5 years ago	36.8	13.5	19.7	...
5 or more years ago	5.3	5.8	5.6	...
Blood pressure screening:				
In previous 12 months	63.2	88.5	81.7	.047
1-5 years ago	21.1	7.7	11.3	...
5 or more years ago	15.8	3.8	7.0	...
Routine dental care:				
In previous 12 months	5.3	30.8	23.9	.005
1-5 years ago	42.1	51.9	49.3	...
5 or more years ago	52.6	17.3	26.8	...
Papanicolaou test for women:				
In previous 12 months	33.3	51.4	48.8	.120
1-5 years ago	16.7	34.3	31.7	...
5 or more years ago	50.0	14.3	19.5	...

¹For these analyses, response options were collapsed and a chi-square test was performed comparing the first response category with the remaining categories.

Table 4. Sociodemographic characteristics of the homeless and nonhomeless poor, northern California, compared with adults from the California population, 1987 (percentages)

Category	Study population			P value	Comparison population ¹
	Shelter absent (N=19)	Shelter present (N=52)	Total (N=71)		
Education:					
Less than high school	36.8	32.7	33.8	.805	26.5
High school graduate	42.1	38.5	39.4	...	53.9
Some college or college graduate	21.1	28.8	26.8	...	19.6
Dependents less than 18 years, at home:					
None	89.5	69.2	74.6	.080	49.3
1 or more	10.5	30.8	25.4	...	50.7
Years lived in county:					
Less than 1	5.3	5.8	5.6	.135	(²)
1-4	31.6	11.5	16.9	...	(²)
5 or more	63.2	82.7	77.5	...	74.8
Risk factors:					
Ever diagnosed as hypertensive	10.5	23.1	19.7	.320	20.0
Current cigarette smoker	68.4	34.6	43.7	.023	28.0
Alcohol problems	26.3	21.2	22.5	.750	20.0
Emotional problems	19.2	10.5	16.9	.240	14.0

¹Information on education, number of dependents, and geographic mobility represents adults 25 years and older from the 1980 California census, and information on risk factors represents adults 18 years and older from the 1982 California Behavioral Risk Factor Survey.

²Unavailable from the comparison populations.

problems than the comparison population, data on these two variables must be viewed with caution because of possible differences in defining and reporting the data. In this study, an alcohol problem was defined as drinking enough to impair normal activities in the month before the survey. An emotional problem was noted if the respondent had ever been hospitalized for psychiatric care or had received counseling from mental health professionals in the 12 months preceding the survey. In the California Behavioral Risk Factor Survey, alcohol use was assessed as episodes of heavy drinking and was defined as having five or more drinks on a single occasion at least once in the past month. Emotional problems were defined as occasional or frequent inability to conduct daily activities due to stress during the past year.

Discussion

This survey provided descriptive data on risk factors for ill health among a group of poverty-stricken homeless and nonhomeless adults. Overall, the sociodemographic profile of the study population was remarkably similar to that of California adults: 66 percent had completed high school, 78 percent were long-term residents of the community, and at most 23 percent reported serious alcohol or emotional problems. Stratified analyses revealed that risks varied according to the presence or absence of shelter, with the homeless poor reporting significantly less health insurance coverage, less preventive health care, and higher rates of cigarette smoking. These results show that risk factors for ill health differ significantly across subgroups of the poor and suggest that impoverished groups of adults may be more heterogeneous than previous researchers have reported.

Comparison with Past Research

Findings from this survey both confirm and contrast with results from other researchers who have examined health profiles of low-income adults. Recent studies have yielded fairly consistent demographic data on the homeless and have countered the stereotype that the homeless are poorly educated, transient people who are burdened by large families. Several studies, for example, have shown that the majority of homeless adults have completed high school, are long-term residents of their communities, and have few or no dependents (13).

The high level of educational attainment among the homeless has been especially consistent across studies. Two recent studies in Illinois and Alabama (21, 22) compared the educational level of the homeless in the samples to that of the general population and found similar levels, with approximately 55 percent having

completed high school. In this survey, 63 percent of the homeless poor and 67 percent of the nonhomeless poor had a high school diploma compared with 74 percent of adults from the 1980 California census. These levels of educational attainment among the homeless, which are unexpected given research documenting the association between low educational attainment and low socioeconomic status (23, 24), may be true findings or may be artifacts explained by imprecision in measurements.

For example, if higher education was measured as a categorical variable, persons with only a few months of technical training beyond high school could be combined with persons with years of advanced, college level education. Such imprecision could lead to an unusual degree of error in studies that compare the educational level of the homeless with adults from the general population, since there may be a differential proportion of persons with a modicum of advanced schooling among the poor. If the reported levels of education among the homeless are accurate, it is important to learn whether some groups are at risk for homelessness because of low educational levels, while others are at risk because problems such as alcohol or drugs mitigate the positive effects of education.

Although past studies of homeless adults have yielded fairly consistent findings on demographic variables, they have yielded inconsistent findings on other variables, such as prevalence of psychiatric disorders (7–10, 12–14, 25, 26). Understanding reasons for these inconsistencies is especially important, given the controversy surrounding rates of mental illness among the homeless. Psychiatric problems may be particularly difficult to measure accurately among the poor; however, the disparate rates may also be explained by differences in sampling strategies and definitions of mental illness.

For example, in a 1984 study, Bassuk and coworkers (9) sampled homeless adults from a Boston emergency shelter and reported that 91 percent had a primary psychiatric diagnosis. In another study in 1983, Lipton and coworkers (8) sampled homeless adults from a New York City emergency psychiatric service and concluded that 72 percent suffered from schizophrenia. Generalizing from these results, the authors estimated that 50 percent of New York's homeless suffered from "significant mental disability" (8). Other surveys have sampled from settings representing a broader spectrum of the homeless and have reported lower prevalence rates (12, 16). In 1985, Roth and Bean (12) sampled 979 homeless persons throughout Ohio and found that 31 percent had psychiatric symptoms serious enough to require mental health services. Even lower rates were reported by Snow and coworkers (16), who sampled 911 homeless adults from Texas and concluded that 15 percent exhibited some evidence of mental illness.

Differences in defining mental illness may also

account for the wide disparity in rates of psychiatric disorders reported among the homeless. This problem is exemplified by a recent report that presented data on psychiatric disorders among a sample of homeless men and women from Baltimore (14). Using the Diagnostic and Statistical Manual of Mental Disorders, overall prevalence rates of psychiatric disorders were estimated at 91 percent for men and 80 percent for women. These unusually high rates can be explained in part by the aggregation of the most severe mental illnesses such as schizophrenia and bipolar disorders with less severe disorders characterized by depression and anxiety. Furthermore, these rates were based on currently active cases as well as cases in remission. When the authors of this and other studies (13, 14) have reported disease-specific rates, a much more conservative picture emerges.

Future Studies

To develop a coherent public policy for the homeless and to resolve conflicting information about the health problems of this population, future work must sample representative groups, standardize the definitions and measurements of variables, and conduct analyses to explore how risk factors differ within subgroups of the population. Identifying subgroups within the poor whose risk profiles may vary is essential, given the increasing diversity of those who are impoverished. Unlike those in the past, the contemporary poor are more heterogeneous and no longer confined to well-delineated geographic areas. For instance, two subgroups with potentially different risk profiles for ill health include the habitual poor, such as those with chronic mental and alcohol problems, and the new poor, such as those affected by unemployment or disruption of families. Other subgroup distinctions can be made according to type of homelessness (for example, chronic, episodic, situational), sociodemographic background (sex, race, educational level), age (youth, single adult men and women, adults with children, elderly), and personal risk factors (dysfunctional childhood, alcohol, drugs, mental illness).

Future work must also consider environmental factors that may adversely affect the health status of those living in poverty (13, 27-29). Potential risk factors in the social and economic environment include unemployment, lack of affordable housing, and inadequate health insurance coverage. Since historically the most dramatic improvements in health among the poor have been achieved when public health measures have targeted environmental conditions, it is likely that programs that conceptualize change as a responsibility to be shared by the broader community as well as the individual person will be the most effective (28). This phi-

losophy, which views the social, physical, and economic environments as important determinants of health and social well-being, is advocated by Bassuk and others (13, 30), who suggest that providing affordable housing, income maintenance, and assistance from social service agencies may reduce rates of poverty, and by Winkelstein (31), who argues that one's risk factors may predict mortality only when combined with one's social and environmental risk factors.

Future work must distinguish factors that predict poverty from those that are a consequence of poverty in order for preventive measures to be effective. For example, a clearer understanding of the extent to which demographic and health related factors contribute to the loss of one's shelter would provide valuable insights in understanding the mechanisms associated with homelessness.

In summary, health professionals who conduct and evaluate research on impoverished groups should be mindful of possible biases introduced into studies because of the difficulties in sampling representative groups of the poor and in defining and obtaining precise measurements of risk variables. To avoid stereotyping the poor as a homogeneous group, investigators should examine subgroups within the sample whose risk profiles for ill health may differ. Finally, to facilitate an integrated approach to the study of poverty and disease, researchers should address both the environments where people live as well as personal factors that give rise to and sustain poverty and poor health.

References

1. Antonovsky, A.: Social class, life expectancy, and overall mortality. *Milbank Mem Fund Q* 45: 31-73 (1967).
2. Kitagawa, E. M., and Hauser P. M.: Differential mortality in the United States: a study in socioeconomic epidemiology. Harvard University Press, Cambridge, 1973.
3. Kaplan, G. A., Haan, M. N., Syme, S. L., and Winkleby, M. A.: Socioeconomic status and health. *In* Closing the gap: the burden of unnecessary illness. Oxford University Press, New York, 1987, pp. 125-129.
4. Marmot, M. G., Kogevinas, M., and Elston, M. A.: Social/economic status and disease. *Soc Class* 8: 111-135 (1978).
5. The continued growth in hunger and homelessness in American cities: 1986. U.S. Conference of Mayors, Washington, DC, 1986.
6. Harrington, M.: The new American poverty. Penguin Books, New York, 1984.
7. Arce, A., Tadlock, M., Vergare, M., and Shapiro, S.: A psychiatric profile of street people admitted to an emergency shelter. *Hosp Community Psychiatry* 34: 812-817 (1983).
8. Lipton, F. R., Sabatini, A., and Katz, S.: Down and out in the city: the homeless mentally ill. *Hosp Community Psychiatry* 34: 817-821 (1983).
9. Bassuk, E. L., Robin, L., and Lauriat, A.: Is homelessness a mental health problem? *Am J Psychiatry* 141: 1546-1550 (1984).
10. Bassuk, E. L., Robin, L., and Lauriat, A.: Characteristics of

- sheltered homeless families. *Am J Public Health* 76: 1097-1101 (1986).
11. Fischer, P., and Breakey, W. R.: Homelessness and mental health: an overview. *Int J Ment Health* 14: 6-41 (1986).
 12. Roth, D., and Bean, G. J.: New perspectives on homelessness: findings from a statewide epidemiological study. *Hosp Community Psychiatry* 37: 712-719 (1986).
 13. Institute of Medicine: Homelessness, health, and human needs. National Academy Press, Washington, DC, 1988.
 14. Breakey, W. R., et al.: Health and mental health problems of homeless men and women in Baltimore. *JAMA* 262: 1352-1357, Sept. 8, 1989.
 15. Gelberg, L., and Linn, L. S.: Assessing the physical health of homeless adults. *JAMA* 262: 1973-1979, Oct. 13, 1989.
 16. Snow, D. A., Eaker, S. G., Anderson, L., and Martin, M.: The myth of pervasive mental illness among the homeless. *Soc Probl* 33: 406-423 (1986).
 17. Piliavin, I., Sosin, M., and Westerfelt, H.: Conditions contributing to long-term homelessness: an exploratory study. Institute for Research on Poverty Discussion Paper No. 853-887. Madison, WI, 1987.
 18. Sosin, M. R., Colson, P., and Grossman, S.: Homelessness in Chicago: poverty and pathology, social institutions and social change. University of Chicago, 1988.
 19. U.S. Bureau of the Census: General social and economic characteristics, Pt. 6, California, Section 1. U.S. Government Printing Office, Washington, DC, 1982.
 20. Folkers, L., Terry, P., Germain, D., and McCullough, J.: Risk factor prevalence study. California Department of Health Services, Sacramento, 1982.
 21. Rossi, P. H., Fisher, G. A., and Willis, G.: The condition of the homeless in Chicago. A report prepared by the Social and Demographic Research Institute, University of Massachusetts at Amherst, and the National Opinion Research Center, University of Chicago, 1986.
 22. LaGory, M., Kitchey, F. J., and Mullis, J.: The homeless of Alabama: final report of the homeless enumeration and survey project. Department of Sociology, University of Alabama at Birmingham, 1987.
 23. Liu, K., et al.: Relationship of education to major risk factors and death from coronary heart disease, cardiovascular disease and all causes: findings of three Chicago epidemiologic studies. *Circulation* 66: 1308-1314 (1982).
 24. Winkleby, M. A., Fortmann, S. P., and Barrett, D. C.: Social class disparities in risk factors for disease: eight-year prevalence patterns by level of education. *Prev Med* 19: 1-12 (1990).
 25. Robertson, M. J.: Mental disorder among homeless persons in the United States: an overview of recent empirical literature. *Admin Ment Health* 14: 14-27 (1986).
 26. Susser, E., Struening, E. L., and Conover, S.: Psychiatric problems in homeless men: lifetime psychosis, substance use, and current distress in new arrivals at New York City shelters. *Arch Gen Psychiatry* 46: 845-850 (1989).
 27. Winkelstein, W.: Epidemiological considerations underlying the allocation of health and disease care resources. *Int J Epidemiol* 1: 69-74 (1972).
 28. Wallack, L., and Winkleby, M. A.: Primary prevention: a new look at basic concepts. *Soc Sci Med* 25: 923-930 (1987).
 29. Hopper, K., Susser, E., and Conover, S.: Economies of makeshift: deindustrialization and homelessness in New York City. *Urban Anthropology* 14: 183-235 (1985).
 30. Bassuk, E. L., and Rosenberg, L.: Why does family homelessness occur? A case control study. *Am J Public Health* 78: 783-788 (1988).
 31. Winkelstein, W.: Contemporary perspectives on prevention. *Bull NY Acad Med* 51: 27-38 (1975).

An Estimate of the Need for Environmental Health Academicians in the Workforce

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This report is an abbreviated version of a position paper in the final report, "Evaluating the Environmental Health Workforce," of a workshop held in July 1987. The workshop was sponsored by the Bureau of Health Professions, Health Resources and Services Administration, Public Health Service. The final report was published in January 1988.

Synopsis

In July 1987, a workshop was held to evaluate the environmental health workforce. The workshop was sponsored by the Bureau of Health Professions, Health Resources and Services Administration of the Public Health Service. Participants were drawn from State and local agencies, Federal agencies, industry, and academia. Estimates of workforce needs were based on background information and informed consensus judgments of workshop participants. The final report of the workshop was published in January 1988.

The authors synthesize some of the consensus judgments and review data from a position paper developed for the workshop. The supply, demand, and projected need for new academicians in environmental health on both graduate and undergraduate levels through 1992 are estimated. These estimates are based on the need